Appl. No. 09/643,316
Response dated 3/1/2004
Reply to Office Action of 10/29/2003

AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1-63. (canceled)

64. (new) A method of indexing occurrences of a value in at least one data record using a bit vector comprising:

associating a first bit vector with a first value to be held in a first field;

associating a second bit vector with a second value to be held in said first field;

associating a first bit vector bit position from a plurality of bit vector positions in said first bit vector to a data record for each of a plurality of data records in a table;

associating a second bit vector bit position from a plurality of bit vector positions in said second bit vector to said data record for each of said plurality of data records in said table;

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determining if said first value exists in said data record in said first field;

determining if said second value exists in said data record in said first field;

assigning a first Boolean value at said first bit vector bit position corresponding to said data record of said first bit vector corresponding to said first value based on said determining if said first value exists step;

assigning a second Boolean value at said first bit vector bit position corresponding to said data record of said second bit vector corresponding to said second value based on said determining if said second value exists step;

accessing said first Boolean value from a bit vector index stored as an array comprising said first bit vector wherein said array comprises a first index accessed via said first value and a second index accessed by said first bit vector bit position;

inverting said first Boolean value of said first bit vector corresponding to said first value at said first bit vector bit position to reflect a change of said first value to said second value in said data record in said first field;

accessing said second Boolean value in said array comprising a second bit vector with said first index accessed by said second value and said second index accessed by said first bit vector bit position and wherein said first value and said second value comprise value limits of said first field; and,

inverting said second Boolean value in said second bit vector corresponding to said second value at said first bit vector bit position to reflect change of said first value to said second value in said data record in said first field.

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65. (new) The method of claim 64, further comprising:

encoding said bit vector into an encoded bit vector.

66. (new) The method of claim 65 wherein said bit vector comprises a sequence of bits and wherein said encoding said bit vector further comprises:

determining whether a frequency of a binary digit is less than a first threshold value; and,

storing at least one position of said binary digit in said encoded bit vector.

67. (new) The method of claim 66 wherein said first threshold value is a number of bits used to store a first number.

68. (new) The method of claim 65 wherein said bit vector comprises a sequence of bits and wherein said encoding said bit vector further comprises:

determining whether a size of a region of like binary digits is greater than a second threshold value; and,

storing a representation of said region in said encoded bit vector.

69. (new) The method of claim 68 wherein said representation comprises a start and an end designation pair representative of a starting position and an ending position of said region.

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70. (new) The method of claim 68 wherein said second threshold is twice a number of bits used to store a second number.

71. (new) The method of claim 65 further comprising:

compressing said encoded bit vector.

72. (new) A method of indexing occurrences of a value in at least one data record using a bit vector comprising:

associating a first bit vector with a first value to be held in a first field;

associating a second bit vector with a second value to be held in said first field;

associating a third bit vector with a third value to be held in a second field;

performing a bit-level "OR" operation on said first bit vector with said second bit vector to yield a first intermediate bit vector;

performing a bit-level "AND" operation on said first intermediate bit vector with said third bit vector to yield a first result intermediate bit vector; and,

storing said first result intermediate bit vector obtained from said performing said bit-level "AND" step.

73. (new) The method of claim 72 further comprising:

performing an operation with a new constraint to produce a second intermediate bit vector.

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74. (new) The method of claim 73 further comprising:

using said second intermediate bit vector as part of an ongoing iterative query.

75. (new) The method of claim 73 further comprising:

using said second intermediate bit vector as part of an ongoing interactive query.

76. (new) A method of indexing occurrences of a value in at least one data record using a bit vector comprising:

associating a first bit vector with a first value to be held in a first field;

associating a second bit vector with a second value to be held in said first field;

calculating a first count to account for values associated with said first field;

associating a third bit vector with a third value to be held in a second field;

calculating a second count to account for values associated with said second field;

performing a first logical "AND" operation on said first bit vector with said third bit vector to yield a first result Boolean value wherein said first logical "AND" operation terminates upon achieving a first successful match;

performing a second logical "AND" operation on said second bit vector with said third bit vector to yield a second result Boolean value wherein said second logical "AND" operation terminates upon achieving a second successful match; and,

storing said first result Boolean value and said second result Boolean value as a value limit correlation wherein said value limit correlation comprises a first index having a first dimension sized to said first count and a second index having a second dimension sized to said second count irregardless of a total data record count.

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77. (new) The method of claim 76 further comprising:

changing said first value in said first field in a first data record to said second value;

inverting a first bit in said first bit vector at a first bit vector position corresponding to said first data record;

inverting a second bit in said second bit vector at said first bit vector position corresponding to said first data record;

performing a third logical "AND" operation on said first bit vector with said third bit vector to yield a third result Boolean value wherein said third logical "AND" operation terminates upon achieving a third successful match;

performing a fourth logical "AND" operation on said second bit vector with said third bit vector to yield a fourth result Boolean value wherein said fourth logical "AND" operation terminates upon achieving a fourth successful match; and,

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updating entries in said value limit correlation having said first index equal to said first value and said second value and having said second index equal to said third value in said second field in said first data record.